Preparing for the

TENNESSEE

End of Course Assessment

Math Foundations II

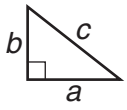
16032

EOC Math Foundations II Reference Page

Abbreviations
A = area
P = perimeter
ℓ = length
w = width

Area (A) of a Rectangle
$A = \ell w$

Perimeter (P)
Any Polygon: P = sum of side lengths
Rectangle: $P = 2\ell + 2w$

Pythagorean Theorem
$a^2 + b^2 = c^2$


n	$\sqrt{n}$	n^2
1	1.000	1
2	1.414	4
3	1.732	9
4	2.000	16
5	2.236	25
6	2.449	36
7	2.646	49
8	2.828	64
9	3.000	81
10	3.162	100
11	3.317	121
12	3.464	144
13	3.606	169
14	3.742	196
15	3.873	225
16	4.000	256
17	4.123	289
18	4.243	324
19	4.359	361
20	4.472	400
21	4.583	441
22	4.690	484
23	4.796	529
24	4.899	576
25	5.000	625

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Educational Measurement

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Preparing for the End of Course Assessment Program Math Foundations II

Introduction

What is this test?

The *Tennessee End of Course Assessment* Program was established to meet the Tennessee mandate for end of course assessments in Tennessee secondary schools. The sample questions in this pamphlet are representative of the item types and item formats that will be used in the actual test.

What are the questions testing?

The questions assess the content standards covered by each course as described in the performance indicators developed by the Tennessee State Department of Education and listed on their Web site.

Who will be tested?

All students taking Math Foundations II will be tested. Tests may be given midyear for block schedules or at the end of the year.

How many questions are there?

Each test contains 60 multiple-choice questions.

How long will the tests take?

Students will have ample time to read and answer each of the questions. Each test will take approximately 90 minutes to complete.

How will the tests be scored?

The answers to the multiple-choice questions will be scored by machine. The test results provide information about how well students understand the course content.

How do I use these sample questions?

The questions in the pamphlet are, for the most part, representative samples of the types of questions that will be on the Math Foundations II test. The questions are presented in a format similar to that which will be used in the actual test. Reporting Categories and Performance Indicators have been provided for the questions in this pamphlet only.

These Reporting Categories group the Math Foundations II Performance Indicators together. When students receive their reports from the test, these Reporting Categories will be used to report scores on student performance. The questions in the actual test will not have this identifying information.

These questions can be used for a classroom learning session or as an individual, short practice test to prepare students for the actual test. Various item formats have been selected in order to familiarize students with the actual test format.

The items in this Preparation Brochure will **not** be found on the End of Course tests. The number of items in this Preparation Brochure does not reflect the emphasis of content on the test.

An answer key for the sample questions is provided at the end of this pamphlet.

Calculators

Students may use their own calculators during the test. The use of calculators is **optional**, and no questions on the test require the use of a calculator. Sharing of calculators during testing is not permitted.

Students may use any four-function, scientific, or graphing calculator, as long as it does not have any features listed below:

- Electronic writing pads or pen input devices
- Built-in capacity to simplify algebraic expressions
- Wireless communication capacity
- Pocket organizer

See the *Test Administration Manual* for more specific guidelines on calculator use.

What tips are there for taking the test?

RELAX: It is normal to be somewhat nervous before the test. Remember that the score is only one of a number of measures of your performance.

LISTEN: Listen to and read the test directions carefully. Ask for an explanation of the directions if you do not understand them. Follow the directions.

PLAN YOUR TIME: Do not spend too much time on any one question. If a question seems to take too long, skip it and return to it later if you have extra time.

First answer all the questions you are sure about.

THINK: If you are not sure how to answer a question, read it again and try your best to answer the question. Rule out answer choices that you know are incorrect and choose from those that remain.

Directions for Using the Pre-test Pamphlet

This Pre-test Pamphlet for Math Foundations II provides specific information to students and teachers. It contains sample items for each Performance Indicator that may be tested in any Math Foundations II test administration. Performance Indicators have been grouped under Reporting Categories. These Reporting Categories will be used to report information regarding performance on the Math Foundations II test to students, teachers, schools, and systems.

The items in this Pre-test Pamphlet will **not** be found in the actual Math Foundations II tests, nor do they reflect the emphasis of content on the tests. These items can be used as a classroom learning session or as an individual, short practice test to prepare students for the actual test. Various item formats have been selected in order to familiarize students with the actual test format.

An answer key for the sample items is provided at the end of this pamphlet.

Reporting Category: **1. Number Sense & Number Theory**
Numbers 1 through 7

Performance Indicator: Choose the correct prime factorization of a two-digit composite whole number.

1 What is the prime factorization of 45 ?

A 5×7
B 5×9
C $3 \times 3 \times 5$
D $3 \times 3 \times 7$

Performance Indicator: Choose the correct prime factorization of a two-digit composite whole number.

2 What is the prime factorization of 76 ?

F 2×37
G $2 \times 2 \times 19$
H $2 \times 3 \times 13$
J $2 \times 2 \times 2 \times 3 \times 3$

Performance Indicator: Compare a fraction to a decimal using less than, greater than, and equals symbols.

3 Which of the following statements is true?

A $\frac{2}{9} > 0.22$

B $\frac{2}{9} < 0.22$

C $\frac{2}{9} = 0.22$

D $\frac{2}{9}$ cannot be compared to 0.22

Performance Indicator: Identify the opposite of any rational number.

4 What is the opposite of 0.125 ?

F $^{-}8$

G $^{-}0.125$

H 0.875

J 8

Performance Indicator: Choose an equivalent exponential form of a one-variable monomial given in factored form (only first-degree variables with positive integral coefficients).

5 **Simplify:** $2 \bullet t \bullet t \bullet 3 \bullet 5 \bullet t$

A $30t^3$

B $90t$

C $2t^2 + 15t$

D $2t^2 + 3 + 5t$

Performance Indicator: Extend a numerical pattern using only whole numbers.

6 What is the sixth term in the number pattern?

1, 5, 4, 8, 7, ____ , 10, 14, 13

F 6

G 8

H 9

J 11

Performance Indicator: Extend a numerical pattern using only whole numbers.

7 What is the eighth term in the following pattern?

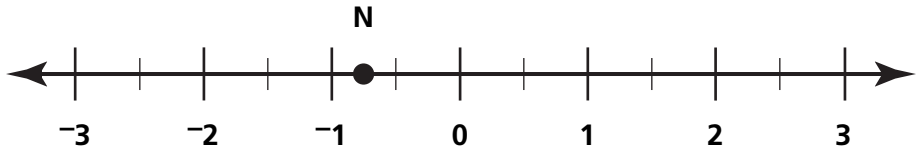
1, 4, 9, 16, 25, 36, 49, ____, 81, 100

A 60
B 62
C 64
D 68

Reporting Category: 2. Estimation & Operations
Numbers 8 through 15

Performance Indicator: Select the best estimate for the coordinate of a given point on a number line (rationals).

8 Which of these is the best estimate of the coordinate of Point N on the number line?



F −0.4
G −0.8
H −1.2
J −1.8

Performance Indicator: Multiply a fraction by a multiple of its denominator $(\text{denominators} \leq 25)$.

9 **Multiply:** $\frac{3}{4} \times 32$

A $\frac{3}{128}$

B $32\frac{3}{4}$

C 24

D 96

Performance Indicator: Apply order of operations to evaluate numerical expressions (whole numbers only; no exponents or grouping symbols).

10 What is $5 \times 2 + 6 \div 3$?

F 12

G 20

H $\frac{16}{3}$

J $\frac{40}{3}$

Performance Indicator: Choose the best estimate for the product of two fractions.

11 Which is the best estimate for $\frac{4}{13} \times \frac{9}{17}$?

A $\frac{1}{10}$

B $\frac{1}{6}$

C $\frac{1}{3}$

D $\frac{1}{2}$

Performance Indicator: Choose the best estimate for the product of two fractions.

12 Which is the best estimate for $\frac{19}{204} \times \frac{42}{397}$?

F $\frac{1}{100}$

G $\frac{1}{10}$

H 1

J 10

Performance Indicator: Multiply an integer by a one-variable binomial.

13 Which expression is equivalent to the following?

$$^{-}7(2x - 3)$$

A $^{-}14x - 21$

B $^{-}14x - 3$

C $^{-}14x + 10$

D $^{-}14x + 21$

Performance Indicator: Apply order of operations to evaluate numerical expressions containing whole numbers, exponents, and no more than two sets of grouping symbols (no power larger than two).

14 **Simplify:** $4(16-8)+(4+2)^2$

F 44
G 52
H 68
J 96

Performance Indicator: Apply order of operations to evaluate numerical expressions containing whole numbers, exponents, and no more than two sets of grouping symbols (no power larger than two).

15 **Simplify:** $(8-4)^2 \div 2 + 6$

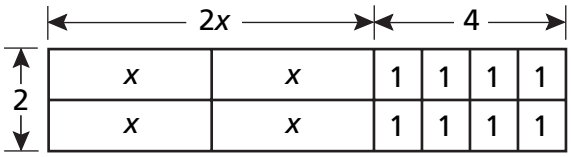
A 2
B 8
C 10
D 14

Reporting Category: **3. Expressions, Equations, and Inequalities**
Numbers 16 through 24

Performance Indicator: Choose the correct area representation of the product of an integer and a one-variable first-degree binomial.

16 Which of these is an area representation of $2(2x + 4)$?

F



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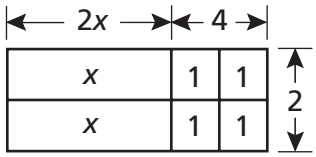

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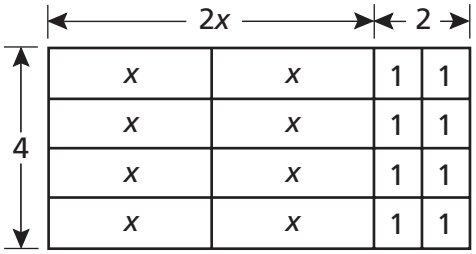

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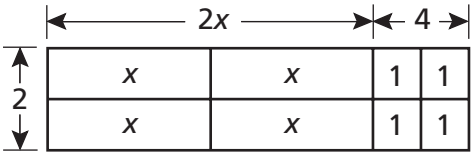


Performance Indicator: Solve a one-step linear equation with a variable on only one side of the equation (integral coefficients and constants).

17 **Solve for y :** $2y = 8.4$

A 16.8
B 8.2
C 6.4
D 4.2

Performance Indicator: Solve a two-step linear equation with a variable on only one side of the equation (integral coefficients and constants).

18 **Solve:** $4x - 6 = {}^{-}22$

F $^{-}20$

G $^{-}7$

H $^{-}4$

J 11

Performance Indicator: Translate a one-variable verbal expression into an algebraic expression (no more than two operations).

19 Which expression represents "n times the square root of five"?

A $n\sqrt{5}$

B $5\sqrt{n}$

C $\sqrt{5n}$

D n^5

Performance Indicator: Translate a one-variable verbal expression into an algebraic expression (no more than two operations).

20 Which expression represents "the sum of y squared and sixteen"?

F $16y^2$

G $(2y)16$

H $y^2 + 16$

J $2y + 16$

Performance Indicator: Evaluate a first-degree algebraic expression given the values for the variables (up to three variables).

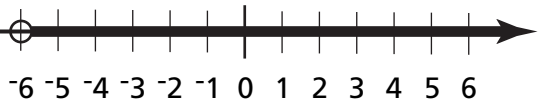
21 What is the value of $15x + 0.1y$ when $x = 3$ and $y = 11$?

A 29.1
B 46.1
C 153.1
D 165.3

Performance Indicator: Select the number line graph that models a given one-step linear inequality (variables may not have negative coefficients).

22 Which of these graphs represents the solution of $3x < -6$?

F



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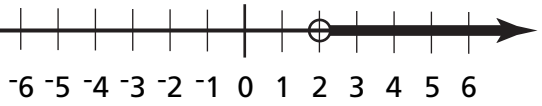

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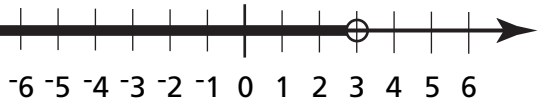

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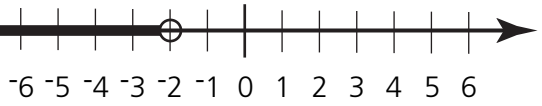


Performance Indicator: Simplify a first-degree algebraic expression without parentheses by combining like terms (integral coefficients and constants).

23 **Simplify:** $12n + 36 - 8n + 20 + 6n$

A $20n - 2$

B $10n + 56$

C $9n + 6$

D $4n + 16$

Performance Indicator: Simplify a first-degree algebraic expression without parentheses by combining like terms (integral coefficients and constants).

24 **Simplify:** $5 - 2x + 3x + 27 - 6$

F $5x + 26$

G $x + 32$

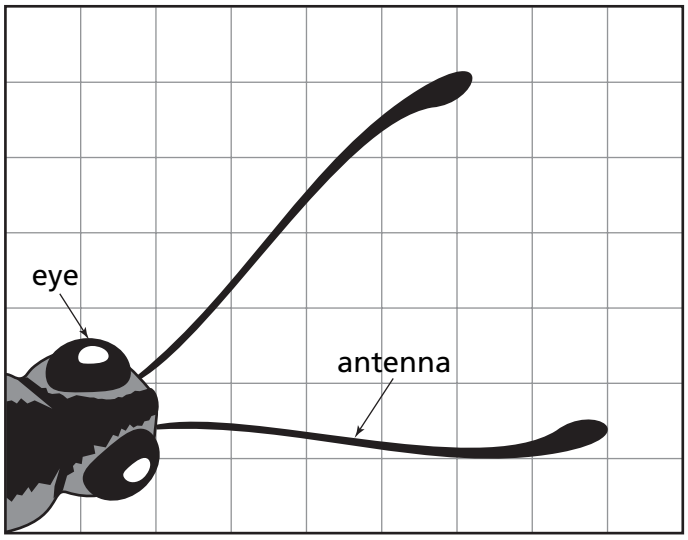
H $x + 26$

J $x + 8$

Reporting Category: **4. Real World Problems**
Numbers 25 through 31

Performance Indicator: Select ratios and proportions to represent real-world problems such as scale drawings and samplings (all ratios are positive integers to positive integers).

25 Brian made a scale drawing of the head of a butterfly on a 1-centimeter grid, as shown below.



Each antenna of the real butterfly was 2 cm long. Which of the following most closely represents the ratio of the length of the antenna in the drawing to the length of the antenna of the real butterfly?

A 1 to 3
B 3 to 1
C 3 to 2
D 6 to 1

Performance Indicator: Select a reasonable solution for a real-world division problem in which the remainder must be considered.

26 Carla is getting ready to go on a 21-day backpacking trip. She wants to have 8 iodine tablets for each day to purify her drinking water. The tablets are sold in bottles of 30. How many bottles does Carla need to buy?

F 8 bottles
G 7 bottles
H 6 bottles
J 5 bottles

Performance Indicator: Select a reasonable solution for a real-world division problem in which the remainder must be considered.

27 Lin has a rusty pipe. The pipe is $19\frac{1}{6}$ feet long. Lin is cutting the pipe into pieces so they will fit in his garbage can. The pieces can be no more than 3 feet long.

What is the fewest number of pieces into which the pipe must be cut?

A 4 pieces
B 5 pieces
C 6 pieces
D 7 pieces

Performance Indicator: Calculate the cost per unit to determine the best buy (no more than four samples).

28 Keisha is buying file folders. The folders come in different-sized packages. The table shows the number of folders per package and the price per package.

Number of Folders	Price
5	$0.90
20	$3.90
100	$18.90

Which statement is true?

F The 5-folder package is cheapest per folder.
G The 20-folder package is cheapest per folder.
H The 100-folder package is cheapest per folder.
J The 5-folder and 20-folder packages cost the same amount per folder.

Performance Indicator: Calculate the cost per unit to determine the best buy (no more than four samples).

29 David is buying party hats for his little sister's birthday party. He has these three brands to choose from:

Brand	Hats per Package	Price
Party Goods	6	$1.29
Happy Hats	8	$1.89
Power Party	10	$2.15

Which of these statements is true?

A Power Party costs more per hat than Party Goods.
B Party Goods is the most expensive brand per hat.
C Happy Hats is the least expensive brand per hat.
D Party Goods and Power Party cost the same amount per hat.

Performance Indicator: Determine the number of possible outcomes for a simple experiment using a list, tree diagram, or the multiplication counting principle.

30 Yolanda and Kyle made sandwiches for a school luncheon. They had 3 types of meat, 3 types of cheese, and 4 types of bread to choose from. Each sandwich was made with one slice of meat, one slice of cheese, and one type of bread. How many different combinations of 1 meat, 1 cheese, and 1 type of bread are possible?

Types of Meat	Types of Cheese	Types of Bread
Turkey	American	White
Chicken	Swiss	Wheat
Ham	Provolone	Rye
		Pumpernickel

F 10
G 13
H 36
J 64

Performance Indicator: Determine the median of a given set of real-world data (even number of data).

31 Joey and his classmates collect Si-Na-Min cards. The number of cards that each owns is recorded on the table.

Name	Number of Cards
Joey	125
Tara	77
Wendy	183
Ahmet	112
Javier	82
Colby	96
Natasha	187
Phil	79

What is the median number of cards?

A 112
B 104
C 97
D 96

Reporting Category: 5. Graphs & Data Analysis
Numbers 32 through 39

Performance Indicator: Determine the mean of a given set of data (no more than five one- or two-digit numbers).

32 Barbara kept a record of the number of books that she and her friends read during the school year. The table shows her results.

Name	Number of Books
Barbara	16
Devon	20
Juan	11
Sharon	6
Tameka	12

What is the mean number of books read by Barbara and her friends?

F 11
G 12
H 13
J 14

Performance Indicator: Determine the mean of a given set of data (no more than five one- or two-digit numbers).

33 Jason listed how many minutes it took him to walk Mrs. Overbrook's poodle over four days. The table shows his results.

Day	Time (minutes)
Monday	33
Tuesday	32
Wednesday	28
Thursday	33

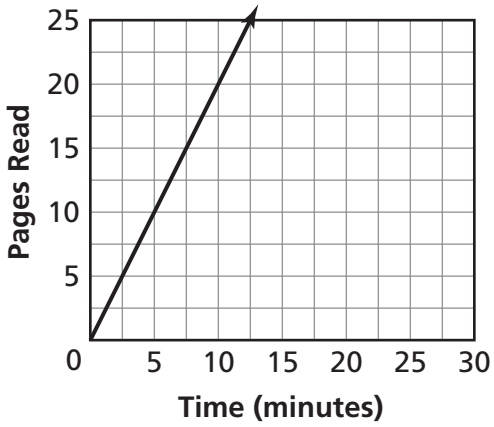
What is the mean of the number of minutes it took Jason to walk the poodle for these four days?

A 30.0
B 31.5
C 32.5
D 33.0

Performance Indicator: Select the appropriate linear graph that models a real-world situation or vice versa.

34 Lindsey is reading a novel at a steady rate of one page every two minutes. Which of these graphs correctly depicts the number of pages she has read as a function of time?

F



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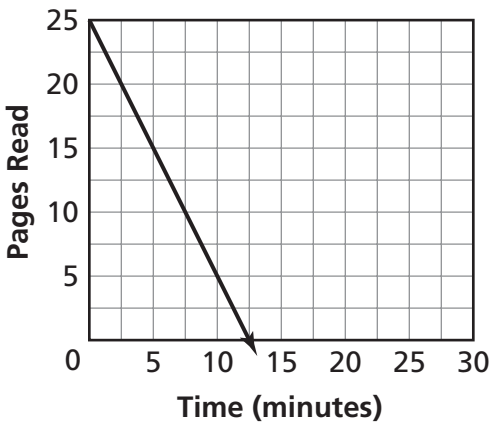

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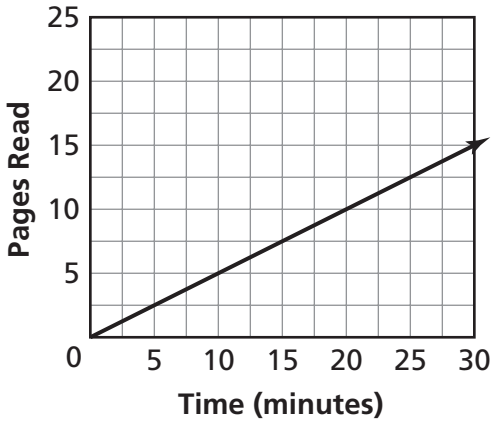

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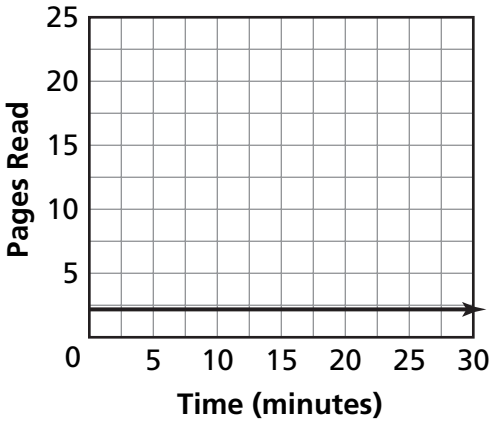


Performance Indicator: Determine the probability of a single event (e.g., rolling a die or using a spinner).

35 A woman randomly selects one marble from a bag containing 7 red marbles, 13 blue marbles, and 20 green marbles. What is the probability that she will select a blue marble from the bag?

A $\frac{1}{2}$

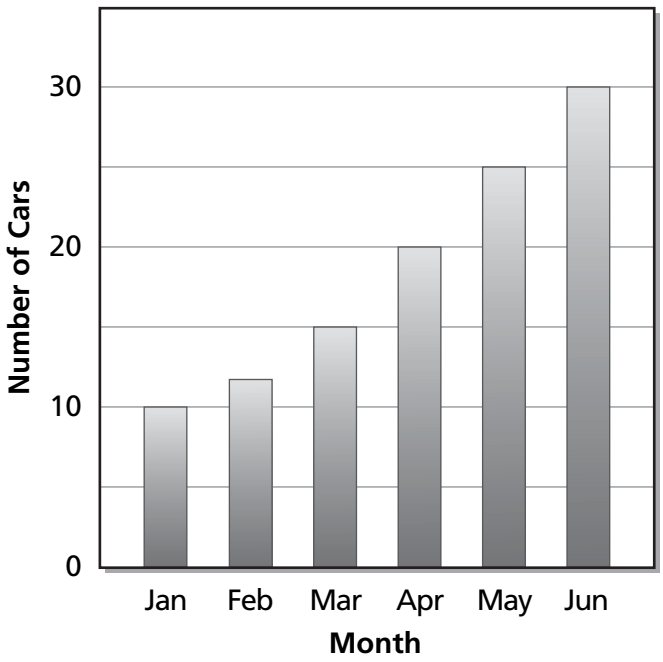
B $\frac{13}{27}$

C $\frac{7}{40}$

D $\frac{13}{40}$

Performance Indicator: Interpret bar graphs representing real-world data.

36 The bar graph shows the number of cars sold at a car dealership during six months.

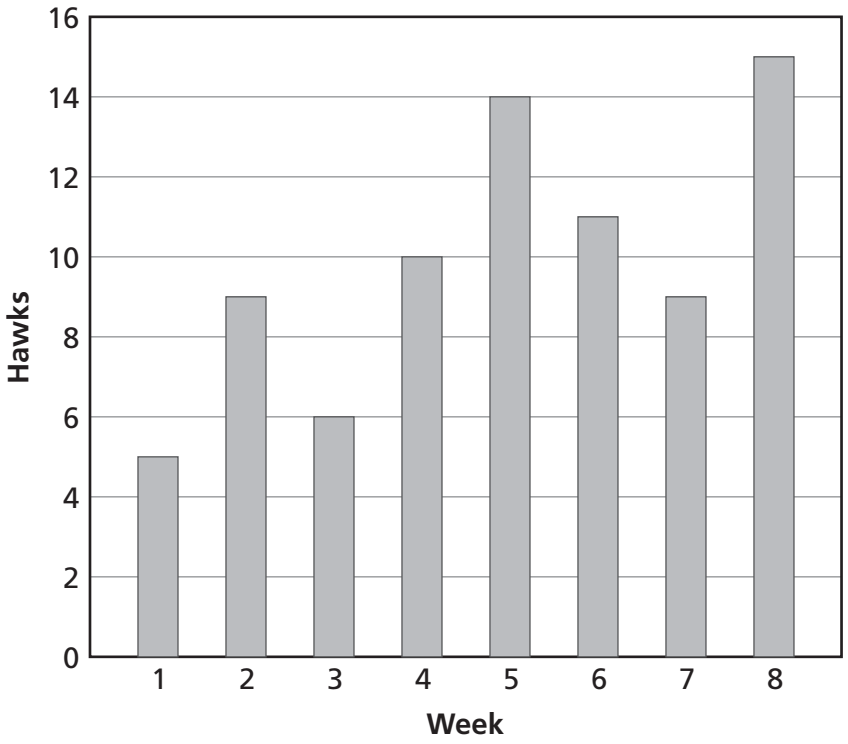


What was the total number of cars sold in April, May, and June?

F 20
G 45
H 75
J 105

Performance Indicator: Interpret bar graphs representing real-world data.

37 Valerie enjoys bird watching. She especially likes hawks. The graph below is a record of the number of hawks Valerie saw each week for 8 weeks.



Which of these statements is <u>false</u>?

A Valerie saw the most hawks in Week 5.

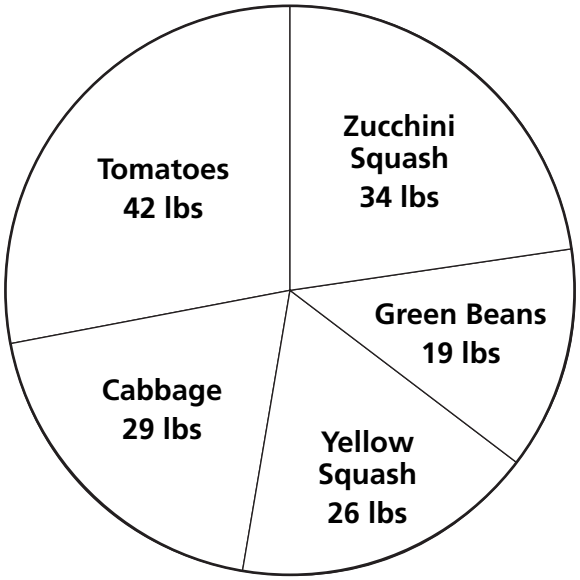
B Valerie saw the fewest hawks in Week 1.

C Valerie saw the same number of hawks in Week 2 and Week 7.

D Valerie saw fewer hawks in Week 3 than in either Week 2 or Week 4.

Performance Indicator: Interpret circle graphs (pie charts) representing real-world data.

38 Jordan recorded the total weights in pounds (lbs) of vegetables he grew one year. His results are shown in the circle graph.



Zucchini and yellow squash together make about what percentage of the total weight of vegetables Jordan grew?

F 40%
G 50%
H 60%
J 70%

Performance Indicator: Determine the median from a given stem-and-leaf plot.

39 The weights in pounds of Joan's 6 sheep are shown in the stem-and-leaf plot.

Stem	Leaf
18	3
19	
20	4 9
21	7
22	
23	1
24	6

where 21|7 represents 217 pounds

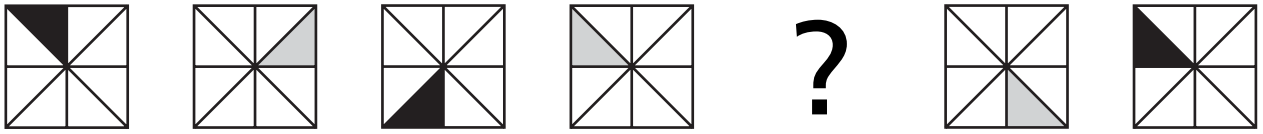
What is the median weight of Joan's sheep?

A 209
B 213
C 215
D 217

Reporting Category: 6. Geometry & Spatial Sense
Numbers 40 through 47

Performance Indicator: Extend a pattern of geometric figures.

40



1st Figure 2nd Figure 3rd Figure 4th Figure 5th Figure 6th Figure 7th Figure

What is the 5th figure in the pattern shown above?

F

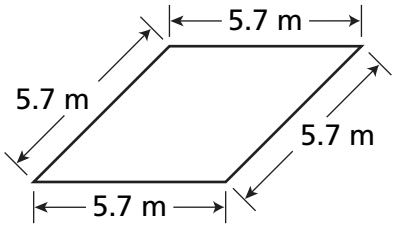
H

G

J

Performance Indicator: Determine the perimeter of any geometric figure.

41 What is the perimeter of a rhombus with each side measuring 5.7 meters (m)?



A 5.7 meters
B 11.4 meters
C 22.8 meters
D 32.5 meters

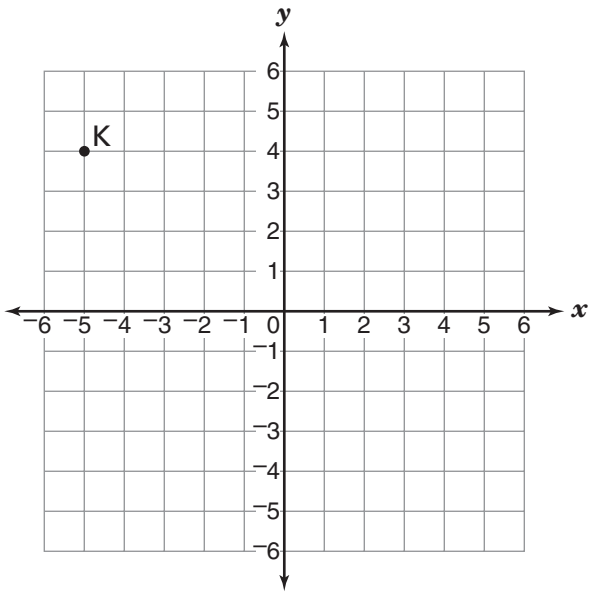
Performance Indicator: Apply the given formula to determine the area of a rectangular figure with rational dimensions.

42 John has a rectangular flower bed that is 4 feet wide and 16 feet long. What is the area of the flower bed?

F 12 square feet
G 20 square feet
H 40 square feet
J 64 square feet

Performance Indicator: Identify the coordinates for a given point.

43



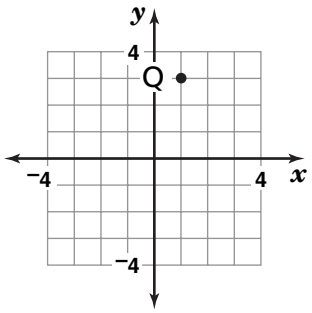
Which ordered pair represents the coordinates of Point K shown on the graph above?

A $(5, -4)$
B $(-5, 4)$
C $(4, -5)$
D $(-4, 5)$

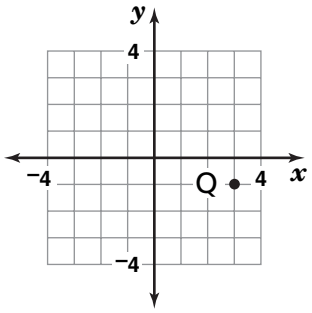
Performance Indicator: Identify the coordinates for a given point.

44 Which graph shows Point Q at the coordinates $(-1, 3)$?

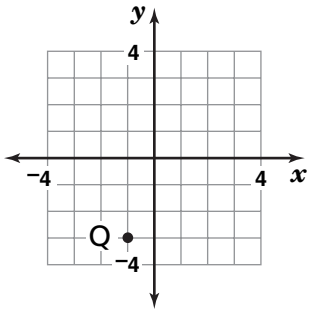
F



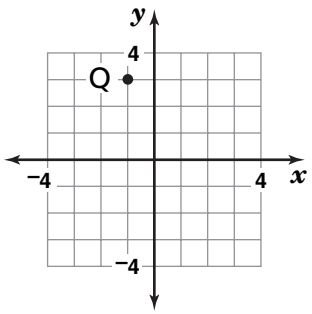
G



H

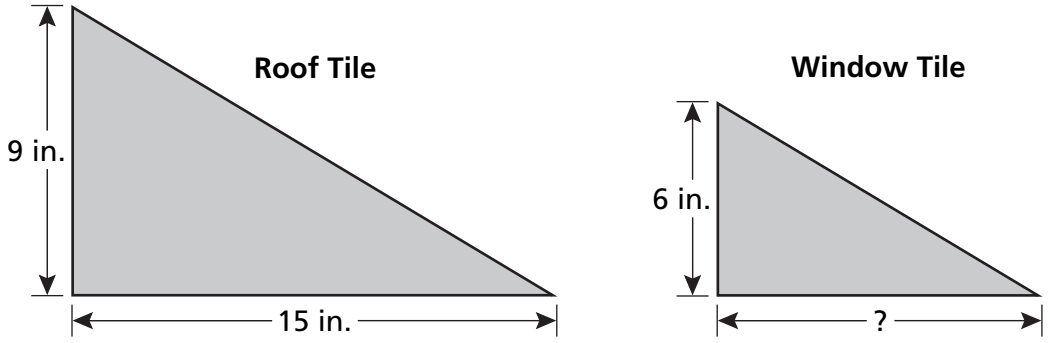


J



Performance Indicator: Find the missing length of a side given two similar triangles.

45 A diagram of a triangular tile used on the roof of the shuttle is shown below.



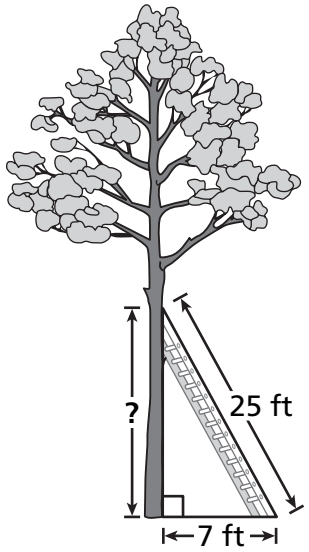
Note: Figures are not drawn to scale.

A similar triangular tile, with a short leg measuring 6 inches, is used near the window. What is the length of the longer leg?

A 12 inches
B 11 inches
C 10 inches
D 9 inches

Performance Indicator: Use the Pythagorean Theorem to determine the length of a missing side of a right triangle (no radicals).

46 A landscaper was hired to trim a tall tree. The landscaper took a 25-foot ladder and leaned it against the tree trunk. The foot of the ladder was 7 feet from the base of the tree trunk. How high up the tree did the ladder reach?

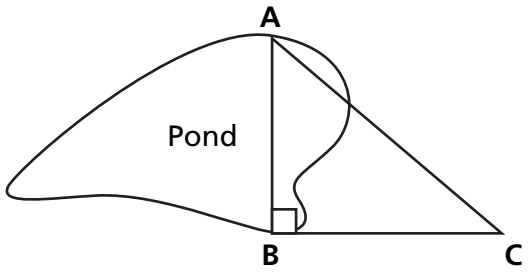


Note: Figure is not drawn to scale.

F 18 feet
G 20 feet
H 22 feet
J 24 feet

Performance Indicator: Use the Pythagorean Theorem to determine the length of a missing side of a right triangle (no radicals).

47 A surveyor needs to find the distance across a small pond. To accomplish this, the surveyor sets stakes at Points A, B, and C so that angle B forms a right angle.



Note: Figure is not drawn to scale.

She measured the distance between Point A and Point C to be 50 meters, and the distance between Point B and Point C to be 40 meters. What is the distance between Point A and Point B?

A 30 meters
B 45 meters
C 75 meters
D 90 meters

Answer Key

Reporting Category:		1. Number Sense & Number Theory
Item Number	Correct Answer	Performance Indicator
1	C	Choose the correct prime factorization of a two-digit composite whole number.
2	G	Choose the correct prime factorization of a two-digit composite whole number.
3	A	Compare a fraction to a decimal using less than, greater than, and equals symbols.
4	G	Identify the opposite of any rational number.
5	A	Choose an equivalent exponential form of a one-variable monomial given in factored form (only first-degree variables with positive integral coefficients).
6	J	Extend a numerical pattern using only whole numbers.
7	C	Extend a numerical pattern using only whole numbers.

Reporting Category:		2. Estimation & Operations
Item Number	Correct Answer	Performance Indicator
8	G	Select the best estimate for the coordinate of a given point on a number line (rationals).
9	C	Multiply a fraction by a multiple of its denominator (denominators ≤ 25).
10	F	Apply order of operations to evaluate numerical expressions (whole numbers only; no exponents or grouping symbols).
11	B	Choose the best estimate for the product of two fractions.
12	F	Choose the best estimate for the product of two fractions.
13	D	Multiply an integer by a one-variable binomial.
14	H	Apply order of operations to evaluate numerical expressions containing whole numbers, exponents, and no more than two sets of grouping symbols (no power larger than two).
15	D	Apply order of operations to evaluate numerical expressions containing whole numbers, exponents, and no more than two sets of grouping symbols (no power larger than two).

Reporting Category:		3. Expressions, Equations, and Inequalities
Item Number	Correct Answer	Performance Indicator
16	F	Choose the correct area representation of the product of an integer and a one-variable first-degree binomial.
17	D	Solve a one-step linear equation with a variable on only one side of the equation (integral coefficients and constants).
18	H	Solve a two-step linear equation with a variable on only one side of the equation (integral coefficients and constants).
19	A	Translate a one-variable verbal expression into an algebraic expression (no more than two operations).
20	H	Translate a one-variable verbal expression into an algebraic expression (no more than two operations).
21	B	Evaluate a first-degree algebraic expression given the values for the variables (up to three variables).
22	J	Select the number line graph that models a given one-step linear inequality (variables may not have negative coefficients).
23	B	Simplify a first-degree algebraic expression without parentheses by combining like terms (integral coefficients and constants).
24	H	Simplify a first-degree algebraic expression without parentheses by combining like terms (integral coefficients and constants).

Reporting Category:		4. Real World Problems
Item Number	Correct Answer	Performance Indicator
25	B	Select ratios and proportions to represent real-world problems such as scale drawings and samplings (all ratios are positive integers to positive integers).
26	H	Select a reasonable solution for a real-world division problem in which the remainder must be considered.
27	D	Select a reasonable solution for a real-world division problem in which the remainder must be considered.
28	F	Calculate the cost per unit to determine the best buy (no more than four samples).
29	D	Calculate the cost per unit to determine the best buy (no more than four samples).
30	H	Determine the number of possible outcomes for a simple experiment using a list, tree diagram, or the multiplication counting principle.
31	B	Determine the median of a given set of real-world data (even number of data).

Reporting Category:		5. Graphs & Data Analysis
Item Number	Correct Answer	Performance Indicator
32	H	Determine the mean of a given set of data (no more than five one- or two-digit numbers).
33	B	Determine the mean of a given set of data (no more than five one- or two-digit numbers).
34	G	Select the appropriate linear graph that models a real-world situation or vice versa.
35	D	Determine the probability of a single event (e.g., rolling a die or using a spinner).
36	H	Interpret bar graphs representing real-world data.
37	A	Interpret bar graphs representing real-world data.
38	F	Interpret circle graphs (pie charts) representing real-world data.
39	B	Determine the median from a given stem-and-leaf plot.

Reporting Category:		6. Geometry & Spatial Sense
Item Number	Correct Answer	Performance Indicator
40	J	Extend a pattern of geometric figures.
41	C	Determine the perimeter of any geometric figure.
42	J	Apply the given formula to determine the area of a rectangular figure with rational dimensions.
43	B	Identify the coordinates for a given point.
44	J	Identify the coordinates for a given point.
45	C	Find the missing length of a side given two similar triangles.
46	J	Use the Pythagorean Theorem to determine the length of a missing side of a right triangle (no radicals).
47	A	Use the Pythagorean Theorem to determine the length of a missing side of a right triangle (no radicals).